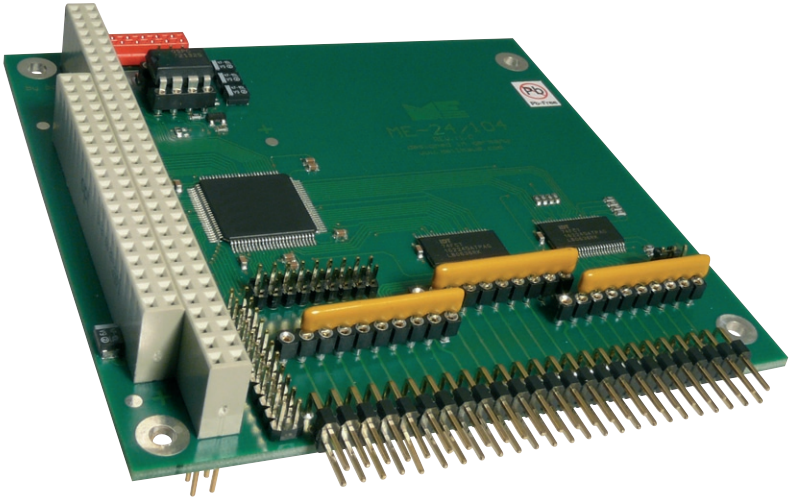


Meilhaus Electronic User Manual

ME-24 PC/104 1.0E



**Embedded PC/104 TTL Digital I/O Board with three 8 bit
Ports**

Impressum

User Manual ME-24 PC/104

Revision 1.0E

Date: 2008-06-17

Meilhaus Electronic GmbH
Fischerstrasse 2
82178 Puchheim/Germany

www.meilhaus.com

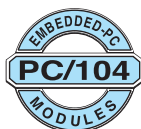
© Copyright 2008 Meilhaus Electronic GmbH

All rights reserved. No part of this publication may be reproduced or distributed in any form whether photocopied, printed, put on microfilm or be stored in any electronic media without the expressed written consent of Meilhaus Electronic GmbH..

Important note:

The information contained in this manual has been reviewed with great care and is believed to be complete and accurate. Meilhaus Electronic assumes no responsibility for its use, any infringements of patents or other rights of third parties which may result from use of this manual or the product. Meilhaus Electronic assumes no responsibility for any problems or damage which may result from errors or omissions. Specifications and instructions are subject to change without notice.

All trademarks acknowledged.



Contents

1	Introduction	5
1.1	Scope of Delivery	5
1.2	Features	5
1.3	System Requirements	6
1.4	Available Software	6
2	Installation	7
3	Hardware	9
3.1	Jumper Positions	9
3.2	Jumper Functions and Registers	10
3.2.1	Setting the connector pin 2 and 4 signal	10
3.2.2	External interrupt	10
3.2.3	Base address	12
3.2.4	Registers	13
	Appendix	15
A	Specifications	15
B	Connector Pinouts	16
B1	Position of pin field/connectors	16
B2	Molex connector - interrupt (external)	16
B3	Pin field connector (digital ports) pinout	16
C	Technical Questions	18
C1	Fax hotline	18
C2	Customer service address	18
C3	Updates	18

1 Introduction

Dear customer,

Thank you for purchasing the ME-24 PC board! On purchase of this board you have selected a high-quality technological product that left our premises in perfect condition.

Please check that your delivery is complete and in good condition. If any faults are obvious, please contact us immediately.

We recommend that you carefully read this manual before installing the board - especially the installation chapter. This also explains how the jumpers can be set for the various board functions.

1.1 Scope of Delivery

It goes without saying that we make every effort to ensure that the product package is complete. But to check whether your delivery is complete, please check your package using the following list.

Your package should contain the following parts:

- TTL digital I/O board, ME-24 PC/104 type, for the ISA-based embedded PC/104 form factor.
- Manual in PDF file format on the ME-Power-CD (optional printed version).
- Molex mating connector for interrupt (external).

1.2 Features

The ME-24 has **24 TTL digital I/O channels**. The ME-24 is an ISA-based PC/104 board. The channels are grouped in **three 8 bit wide TTL ports**. Each port can be configured **as input or output via software**. With its **extended temperature range** and an additional, external interrupt input, the ME-24 is the ideal solution for industrial embedded systems.

- Three 8 bit TTL digital I/O ports.
- **Wide range of base addresses** (base address selected via jumper).
- **Additional, external interrupt in put.**
- **Extended temperature range -40...+85°C.**
- For the ISA-based PC/104 form factor.

1.3 **System Requirements**

The ME-24 will be used with a PC/104 stack with Intel® processor or compatible.

1.4 **Available Software**

The ME-24 can directly be programmed on register level with common programming languages/environments and operating systems.

2 Installation

When installing the board in a PC/104 stack do not use inappropriate force. It should be possible to insert the board into other PC/104 modules without a great deal of effort. Please note the relevant regulations of the PC/104 standard for assembly.



Caution!

Risk of destroying highly sensitive components through electrostatic discharge! Therefore, make sure you dissipate your body's charge before installing the board, for example, by touching a blank casing element on your computer.

3 Hardware

3.1 Jumper Positions

Figure 1 shows the jumper positions. They are referred to as ST1 to ST4.

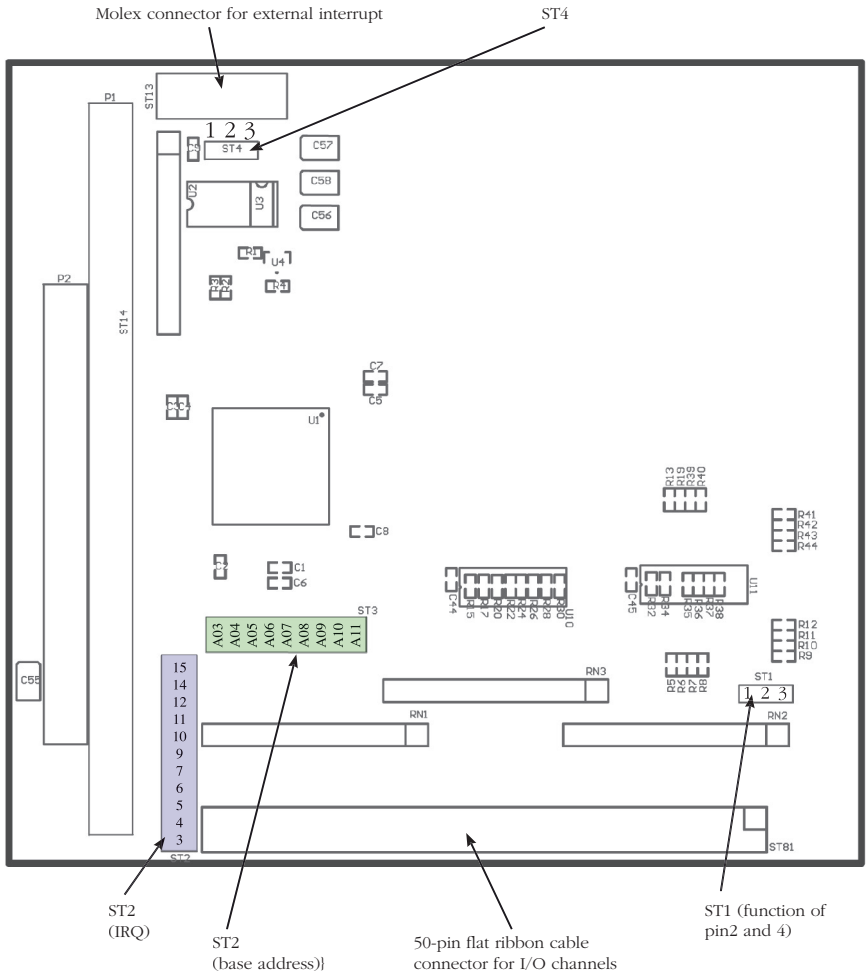


Figure 1: Jumper positions:

3.2 Jumper Functions and Registers

3.2.1 Setting the connector pin 2 and 4 signal

With jumper **ST1** you can set the signal available at the **pins 2 and 4** of the 50-pin flat ribbon cable connector. The signal at pin 2 and 4 can either be GND or +12 V PC power.

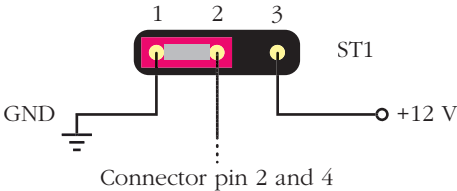


Figure 2a: Jumper ST1 for pin 2 and 4 signal

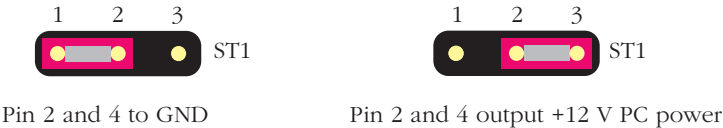


Figure 2b: Settings for jumper ST1

3.2.2 External interrupt

Jumper **ST2** is used to set the **interrupt (external)**. You can select IRQ 3 - 7, 9 - 12, 14, 15 (see figure 2a). The default setting for IRQ external is 7. The example below (see figure 2b) shows how to set IRQ 9.

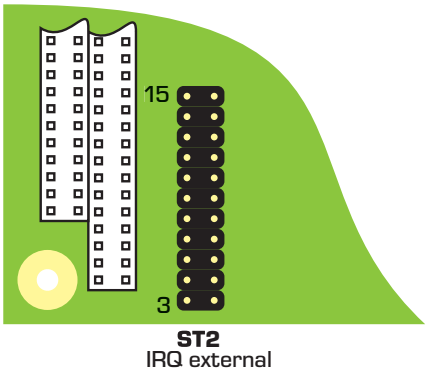


Figure 3a: Jumper ST2 sets the interrupt line

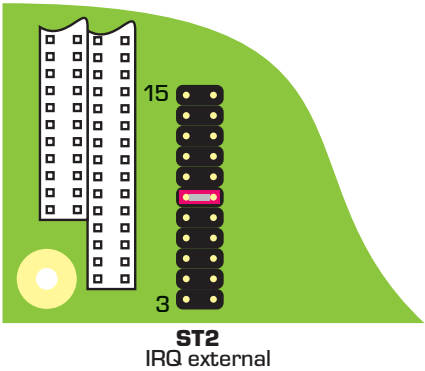


Figure 3b: Example - IRQ 9 for external interrupt

3.2.3 Base address

The **base address** of the board is set with jumper **ST3** (figure 3a). The jumpers are related to the address lines as shown in figure 4. If a jumper is set, it is “1”. The default setting of the base address is 750 Hex. The example in figure 3b shows how to set the address 700 Hex:

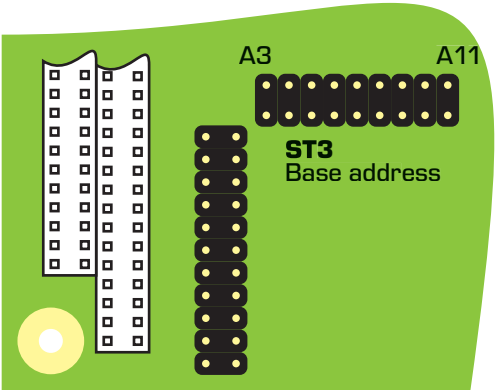


Figure 4a: Jumper ST3 for setting the base address

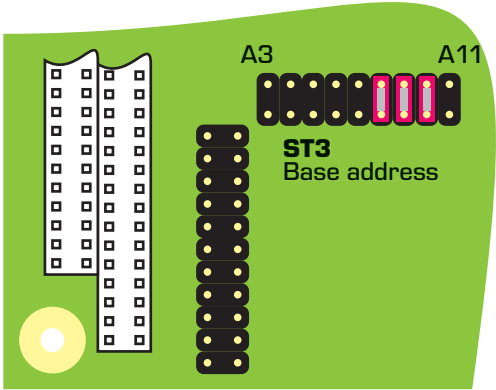


Figure 4b: Example - how to set address 700 Hex

A19	A18	A17	A16	A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0
=> 11100000000 => 700 Hex																			

Figure 5: Relation of jumpers and address lines

3.2.4 Registers

3.2.4.1 Register functions

The ME-24 can be programmed on register level. Die board uses 4 successive bytes in the I/O address space of your PC, beginning with the base address (BA) set with the jumper as described above (R = read, W = write):

Offset	Read/write	8 bit register
BA + 4	R/W	Port A
BA + 5	R/W	Port B
BA + 6	R/W	Port C
BA + 7	W	Control register

3.2.4.2 Functions of the control register

With the control register you can configure all lines of a port to be inputs or outputs. The ME-24 emulates the well known chip 8255. The bits marked with "x" have special functions on the 8255, but are not used on the ME-24. They have the status "don't care" and can be set to 0 or 1 with no difference. Port C is divided, the lower and upper 4 bits (or lines) can be configured as inputs or outputs:

Controll word (base address + 7)								Port A	Port B	Port C	
										Upper	Lower
x	x	x	0	0	x	0	0	Output	Output	Output	Output
x	x	x	0	0	x	0	1	Output	Output	Output	Input
x	x	x	0	1	x	0	0	Output	Output	Input	Output
x	x	x	0	1	x	0	1	Output	Output	Input	Input
x	x	x	0	0	x	1	0	Output	Input	Output	Output
x	x	x	0	0	x	1	1	Output	Input	Output	Input
x	x	x	0	1	x	1	0	Output	Input	Input	Output
x	x	x	0	1	x	1	1	Output	Input	Input	Input
x	x	x	1	0	x	0	0	Input	Output	Output	Output
x	x	x	1	0	x	0	1	Input	Output	Output	Input
x	x	x	1	1	x	0	0	Input	Output	Input	Output
x	x	x	1	1	x	0	1	Input	Output	Input	Input
x	x	x	1	0	x	1	0	Input	Input	Output	Output
x	x	x	1	0	x	1	1	Input	Input	Output	Input
x	x	x	1	1	x	1	0	Input	Input	Input	Output
x	x	x	1	1	x	1	1	Input	Input	Input	Input

Appendix

A Specifications

PC/104 interface

Bus interface	ISA-16 bit-based PC/104 embedded bus
Base addresse	Jumper selectable in a wide range, the jumpers correspond to the address lines A3...A11
Interrupt	External interrupt input, jumper selectable 3...7, 9...12, 14, 15

Digital I/O

Lines, ports	24 I/O lines grouped in three 8 bit wide, bidirectional ports. Each port programmable as input or output
Level	Output level: U_{OL} max. 0.5 V at 24 mA U_{OH} min. 2.4 V at -24 mA Input level: U_{IL} max. 0.8 V at $V_{CC} = 5$ V U_{IH} min. 2 V at $V_{CC} = 5$ V Input current: ± 1 μ A
External interrupt	Directly sent to system, if enabled. Level: TTL, see digital I/O channels

General Data

Power consumption	40 mA (no load)
Size	(mm) 90 x 96 (board only), 105 x 96 x 24 (board incl. connectors)
Connectors	PC/104 bus connector and 1x flat ribbon cable connector, 10-pin Molex for interrupt (external, Molex mating connector included)
Temperature range	-40...+85°C
Humidity	20...55% (non condensing)

CE certification

EC directive	89/336/EMC
Emission	EN 55022
Immunity	EN 50082-2

B Connector Pinouts

B1 Position of pin field/connectors

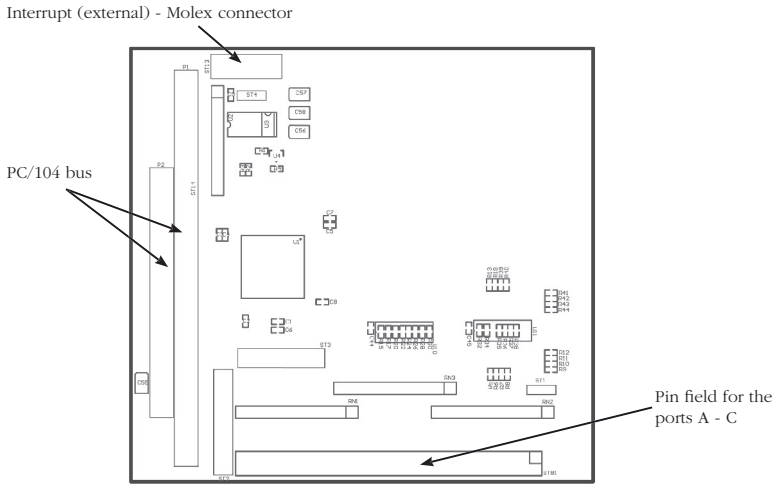


Figure 6: Position of the pin field connectors on the ME-24

B2 Molex connector - interrupt (external)

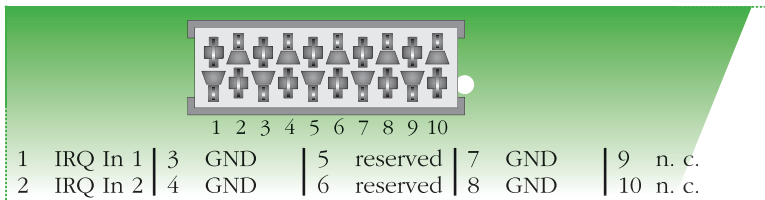


Figure 6: Molex connector pinout (Molex mating connector included)

B3 Pin field connector (digital ports) pinout

Pinout see table on the following page!

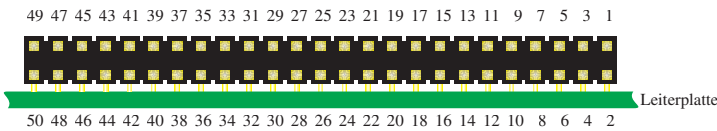


Figure 7: 50-pin pinfield of the ME-24, view from front side

Name	Pin	Pin	Name	Channel
GND	50	49	+5V	-
GND	48	47	PA 0	0
GND	46	45	PA 1	1
GND	44	43	PA 2	2
GND	42	41	PA 3	3
GND	40	39	PA 4	4
GND	38	37	PA 5	5
GND	36	35	PA 6	6
GND	34	33	PA 7	7
GND	32	31	PB 0	8
GND	30	29	PB 1	9
GND	28	27	PB 2	10
GND	26	25	PB 3	11
GND	24	23	PB 4	12
GND	22	21	PB 5	13
GND	20	19	PB 6	14
GND	18	17	PB 7	15
GND	16	15	PC 0	16
GND	14	13	PC 1	17
GND	12	11	PC 2	18
GND	10	9	PC 3	19
GND	8	7	PC 4	20
GND	6	5	PC 5	21
+12 V/GND	4	3	PC 6	22
+12 V/GND	2	1	PC 7	23

Figure 8: Pinout of the 50-pin flat ribbon cable connector/pinfield

Note: Pins 2 and 4 can either be GND or +12 V PC power. Use jumper ST1 to select (see description of the jumpers).

C Technical Questions

C1 Fax hotline

If you have technical questions or problems relating to the board, please send a detailed description of the problem to our hotline:

Fax hotline:

within Germany: (089) 89 01 66-28

from abroad: ++49 - 89 - 89 01 66-28

Email hotline:

support@meilhaus.com

C2 Customer service address

We hope that you will never need this part of the manual. If your board has a technical defect, please contact us at:

Meilhaus Electronic GmbH

Abteilung Reparaturen

Fischerstrasse 2

D-82178 Puchheim, Germany

If you want to return your board for repair, please enclose a detailed description of the error including details of your computer/system and the software used! The simplest method is to use our **RMA procedure** which you will find online at

www.meilhaus.com/en/service/rma-procedure/

C3 Updates

The current drivers for Meilhaus Electronic boards and our manuals in PDF format are available from **www.meilhaus.de**

Index

Symbols

8255 13

A

Appendix 15

B

Base address 12

C

Connectors 15

Connector Pinouts 16

Controll word 13

control register 13

Customer service address 18

D

Digital I/O 15

E

Email hotline 18

External interrupt 10

F

Fax-Hotline 18

Features 5

Functions of the control register
13

H

Hardware 9

I

Installation 7

interrupt 10

IRQ 10

J

jumper 9, 10, 12

Jumper Functions and Registers

10

Jumper Positions 9

L

Level 15

M

Molex connector 16

P

PC/104 interface 15

Port A 13

Port B 13

Port C 13

Position of pin field/connectors
16

R

Registers 13

Register functions 13

RMA procedure 18

S

Scope of Delivery 5

Setting the connector pin 2 and 4
signals 10

Size 15

Specifications 15

System Requirements 6

T

Technical Questions 18

Temperature range 15

U

Updates 18

